



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/183,479	10/30/1998	MICHAEL JAMES LIBERATORE	SAR12743	3193

40562 7590 08/15/2005

SARNOFF/JACKSON
PATENT DEPARTMENT, SARNOFF CORPORATION
201 WASHINGTON ROAD CN 5300
PRINCETON, NJ 08543-5300

EXAMINER

MAYES, MELVIN C

ART UNIT

PAPER NUMBER

1734

DATE MAILED: 08/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/183,479

Applicant(s)

LIBERATORE ET AL.

Examiner

Melvin Curtis Mayes

Art Unit

1734

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 May 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 12-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 12-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

(1)

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

(2)

Claims 16 and 26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "about" in claims 16 and 26 is a relative term which renders the claim indefinite. The term "about 30 poise" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

The specification only discloses conventional viscosity of 45 poise (at a shear rate of 100 rad/s) versus present ink viscosity of 30 poise (at 100 rad/s). There are no other viscosity values recited that would allow one of ordinary skill in the art to determine what viscosity values are encompassed by "about 30 poise." It is suggested that the claims be limited to 30 poise since otherwise, the scope of the claim cannot be reasonably apprised.

It is also suggested that the claims referring the viscosity also state the shear rate since viscosity varies depending on the shear rate used to measure viscosity.

Claim Rejections - 35 USC § 103

(3)

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

(4)

Claims 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 8-264364 in view of Amendola et al. 4,546,065.

JP 8-264364 discloses a method of making an inductance component comprising: compressing a green sheet insulator layer 3 with a convex metal mold 10 to form a recess having a coil pattern in the green sheet; printing conductive paste into the recess to form a conductor; laminating a number of layers; and baking (firing) (Abstract and computer translation [0015]). JP '364 does not specifically disclose using heat while compressing the green sheet with the metal mold.

Amendola et al. teach that in embossing indentations into a ceramic green sheet by pressing a die against the surface of the greensheet, embossing conditions involve heating the greensheet to a temperature at which the binder in the greensheet flows and can be shaped under pressure such as 75° to about 95°C (167-203°F) and pressure of 500 to 3000 psi (col. 7, lines 3-33).

It would have been obvious to one of ordinary skill in the art to have modified the method of JP '364 for making an inductance component by forming the recess coil pattern in the green sheet by compressing with the metal mold at temperature in the range of 75° to about 95°C (167-203°F) and pressure of 500 to 3000 psi, within or encompassing temperatures and pressures

Art Unit: 1734

as claimed in Claims 13 and 14, as taught by Amendola et al., as temperature and pressure at which is green sheet is embossed by a die so that the binder in the greensheet flows and can be shaped under pressure. Using screen printing to print the conductive paste in the recess would have been obvious to one of ordinary skill in the art as the conventional method used to print green sheets.

(5)

Claims 12 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over IBM Technical Disclosure Bulletin (April 1974) in view of Schmeckenbecher 3,948,706.

IBM Technical Disclosure Bulletin (April 1974) discloses a method of screen printing on indented green sheets to form a multilayer ceramic module having screen-printed lines of increased conductivity comprising: pressing indentations of desired conductor patterns into the PVA coated side of a green sheet by hot stamping using an embossed metal plate under temperature and pressure; filling the indentation by screen printing by squeegeeing conductive paste of metal powder and organic vehicle into the indentations; stacking green sheets; and co-firing.

Schmeckenbecher teaches that when metallizing a green sheet using polyvinyl alcohol film on the green sheet as a mask material, the polyvinyl alcohol (PVA) mask material and green sheet are thermally machined, stamped or cut to form the recessed lines in the green sheet. As shown in the figures and suggested, the PVA is only on the surface of the green sheet to form a mask for applying paste to the recess and the paste is non-solvent to the PVA and the PVA is non-wettable to the paste (Figure, col. 2-3).

It would have been obvious to one of ordinary skill in the art to have screen printed the paste directly into the greens sheet using the PVA on the green sheet as a mask for screen printing in the method of IBM Technical Disclosure Bulletin (April 1974), as Schmeckenbecher teaches that when metallizing a green sheet using PVA film on the green sheet as a mask material, after the (PVA) film and green sheet are thermally machined, stamped or cut to form the recessed lines in the green sheet, the PVA is only present as a mask on the surface of the green sheet. Stamping such that the PVA is only on the surface and the paste can be filled directly into the indentation in the green sheet would have been obvious to one of ordinary skill in the art because Schmeckenbecher teaches that when using PVA as a mask, the paste is non-solvent to the PVA and the PVA is non-wettable to the paste and it would have been obvious to one of ordinary skill in the art that PVA cannot be present in the indentation to be filled since The PVA is non-wettable to the paste while the paste is non-solvent to the PVA, thus PVA in the indentation would also function as a mask prevent filling of the indentation with paste.

(6)

Claims 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over IBM Technical Disclosure Bulletin (April 1974) in view of Schmeckenbecher 3,948,706 and Prabhu 5,277,724.

IBM Technical Disclosure Bulletin (April 1974) discloses a method of screen printing on indented green sheets to form a multilayer ceramic module having screen-printed lines of increased conductivity comprising: pressing indentations of desired conductor patterns into the PVA coated side of a green sheet by hot stamping using an embossed metal plate under temperature and pressure; filling the indentation by screen printing by squeegeeing conductive paste of metal powder and organic vehicle into the indentations; stacking and laminating green

Art Unit: 1734

sheets; and co-firing. IBM Technical Disclosure Bulletin (April 1974) does not disclose laminating the green sheets onto a metal support coated with a low melt temperature glass.

Schmeckenbecher teaches that when metallizing a green sheet using polyvinyl alcohol film on the green sheet as a mask material, the polyvinyl alcohol (PVA) mask material and green sheet are thermally machined, stamped or cut to form the recessed lines in the green sheet. As shown in the figures and suggested, the PVA is only on the surface of the green sheet to form a mask for applying paste to the recess and the paste is non-solvent to the PVA and the PVA is non-wettable to the paste (Figure, col. 2-3).

Prabhu teaches that multi-layered, co-fired ceramic on a metal base is formed by utilizing a bonding layer of low softening point glass and co-firing to bond the ceramic to the metal base. The bonding layer of glass provides a means of attaching the multi-layered ceramic to the base and minimizes shrinkage of the ceramic during the firing (col. 1, line 55 - col. 2, line 48).

It would have been obvious to one of ordinary skill in the art to have screen printed the paste directly into the green sheet using the PVA on the green sheet as a mask for screen printing in the method of IBM Technical Disclosure Bulletin (April 1974), as Schmeckenbecher teaches that when metallizing a green sheet using PVA film on the green sheet as a mask material, after the (PVA) film and green sheet are thermally machined, stamped or cut to form the recessed lines in the green sheet, the PVA is only present as a mask on the surface of the green sheet. Stamping such that the PVA is only on the surface and the paste can be filled directly into the indentation in the green sheet would have been obvious to one of ordinary skill in the art because Schmeckenbecher teaches that when using PVA as a mask, the paste is non-solvent to the PVA and the PVA is non-wettable to the paste and it would have been obvious to

Art Unit: 1734

one of ordinary skill in the art that PVA cannot be present in the indentation to be filled since The PVA is non-wettable to the paste while the paste is non-solvent to the PVA, thus PVA in the indentation would also function as a mask prevent filling of the indentation with paste.

It would have been obvious to one of ordinary skill in the art to have further modified the method of IBM Technical Disclosure Bulletin (April 1974) for making a multilayer ceramic module by co-firing the laminated green sheets on a metal base using a low melting bonding layer of glass, as taught by Prabhu, for attaching a multi-layered ceramic to a base and minimize shrinkage of the ceramic during firing.

(7)

Claims 13, 14, 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claim 12 or 22 in paragraphs (5) or (6), and further in view of Amendola et al. 4,546,065.

Amendola et al. teach that in embossing indentations into a ceramic green sheet by pressing a die against the surface of the greensheet, embossing conditions involve heating the greensheet to a temperature at which the binder in the greensheet flows and can be shaped under pressure such as 75° to about 95°C (167-203°F) and pressure of 500 to 3000 psi (col. 7, lines 3-33).

It would have been obvious to one of ordinary skill in the art to have modified the method of the references as combined by hot stamping the indentations in the green sheet under pressure and temperature in the ranges of 75° to about 95°C (167-203°F) and 500 to 3000 psi, as taught by Amendola et al. as temperatures and pressures suitable for embossing indentations in a green sheet. Hot stamping (embossing) at temperatures and pressures within the ranges as

Art Unit: 1734

claimed in Claims 13, 14, 23 and 24 would have been obvious to one of ordinary skill in the art, as taught by Amendola et al.

(8)

Claims 17, 18, 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claim 12 or 22 in paragraphs (5) or (6), and further in view of Vitriol et al. 5,028,473.

Vitriol et al. teach that in a multi-layer co-fired ceramic, electrical circuit patterns on the green sheets include not only metallizations but may further include resistors, capacitors, inductors and other electrical components compatible with the process, the patterns formed on the sheets by screening or any other suitable method (col. 4, lines 57-63).

It would have been obvious to one of ordinary skill in the art to have modified the method of the references as combined for making a multilayer ceramic module by also screen printing resistors or capacitors in indentations in the green sheet, as taught by Vitriol et al., as also screened on green sheets for making a multi-layer, co-fired ceramic laminate. Screen printing the green sheet with conductive paste and resistor paste or capacitor paste would have been obvious to one of ordinary skill in the art as Vitriol et al. teach that in a multi-layer co-fired ceramic, these electrical components may also be included by screen printing.

(9)

Claims 19, 20, 29 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claim 18 or 28 in paragraph (8), and further in view of either Hernandez 5,272,590 or Tormey et al. 5,953,203.

Hernandez teaches that a dielectric layer for a capacitor can be printed of dielectric paste which include barium titanate, lead magnesium niobate or strontium titanate (col. 8, lines 45-50).

Tormey et al. teach that a multilayer ceramic board is provided with embedded capacitors by screen printing capacitor ink of barium titanate or lead magnesium niobate (col. 2-7)

It would have been obvious to one of ordinary skill in the art to have screen printed capacitors in indentations in the green sheet using a paste of either barium titanate or lead magnesium niobate, as taught by Hernandez, as dielectric materials used in paste for printing a dielectric layer for a capacitor, or as taught by Tormey et al., as capacitor ink screen printed to provide a multilayer ceramic board with embedded capacitors.

(10)

Claims 21 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claim 12 or 22 in paragraphs (5) or (6), and further in view of Hayama et al. 5,609,704.

Hayama et al. teach that when filling a groove with conductive paste, the volume of the paste filling the groove is reduced by an amount corresponding to the evaporated organic solvent and teaches that the filling is repeated to fill up the reduced amount so that the thickness of the paste can be set at the same value at the depth of the groove (col. 8, lines 16-27).

It would have been obvious to one of ordinary skill in the art to have modified the method of the references as combined for making a multilayer ceramic module by repeating the step of screen printing the paste in the indentations, as taught by Hayama et al., to set the thickness of the paste in the indentation to the same value as the depth of the indentation, as paste upon drying reduces in volume by an amount corresponding to the evaporated organic solvent.

Allowable Subject Matter

(11)

Claims 16 and 26 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Response to Arguments

(12)

Applicant's arguments filed April 6, 2005 have been fully considered but they are not persuasive.

Applicant argues that the IBM TDB (TBD-2), the purpose of the PVA is believed to be to smooth the surface and reduce adhesion of paste outside the indentations and argues that the reference names screen printing but describes squeegeeing. Applicant argues that Amendola uses a glaze to facilitate application of metal paste to channel and only fills channels after firing,

argues that Vitriol makes capacitors and resistors without the aid of channels and argues that Hayama teaches squeegeeing.

(13)

As set forth the present rejection, as taught by Schmeckenbecher, the PVA functions as a mask for metallizing recessed lines in a green sheet and is only present on the surface of the green sheet for filling the recesses with paste. Although TBD-2 discloses screen printing but describes uses squeegeeing to fill the indentations with paste, this is a screen printing process. As also taught by Tanaka et al. 5,410,957 and Balz et al. 5,927,193 cited of interest, screen printing uses a squeegee and mask, template or stencil.

Amendola is pertinent because of its teaching of temperatures and pressures used to emboss a ceramic green sheet, not the particulars of its method of making a multilayer substrate. Vitriol is pertinent because of its teaching to provide green sheets not only with metallization but also with resistors, capacitors, inductors and other electrical components which can be formed by screening. Making channels is disclosed by TBD-2. With respect to Hayama and squeegeeing, as set forth previously, squeegeeing is a part of a screen printing process.

Conclusion

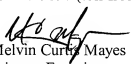
(14)

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melvin Curtis Mayes whose telephone number is 571-272-1234. The examiner can normally be reached on Mon-Fri 7:30 AM - 4:00 PM.

Art Unit: 1734

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chris Fiorilla can be reached on 571-272-1187. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Melvin Curtis Mayes
Primary Examiner
Art Unit 1734

MCM
August 11, 2005